

SECTION 32 11 24

AGGREGATE DRAINAGE LAYER

PART 1 – GENERAL

1.01 SECTION INCLUDES

- A. Aggregate drainage fill.
- B. Vapor barrier.
- C. Sand cushion.
- D. Field quality control.

1.02 RELATED SECTIONS

- A. Preparation of sub grade is specified in Contract Specifications Section 31 00 00, Earthwork.
- B. Drainage and filter aggregates for subsurface drainage systems are specified in Contract Specifications Section 33 46 00, Subdrainage.
- C. Vapor barrier is specified in Contract Specifications Section 07 26 00, Vapor Retarders.

1.03 MEASUREMENT AND PAYMENT

- A. General: Measurement and payment for aggregate drainage fill and sand cushion will be by the lump-sum method or by the unit-price method as determined by the listing of the bid item for aggregate drainage fill and sand cushion indicated in the Bid Schedule of the Bid Form.
- B. Lump sum: If the Bid Schedule indicates a lump sum for aggregate drainage fill and sand Cushion, the lump sum method of measurement and payment will be in accordance with Contract Specifications Section 01 20 00, Price and Payment Procedures.
- C. Unit Price:
 - 1. If the Bid Schedule indicates a unit price for aggregate drainage fill and sand cushion, the unit price method of measurement and payment will be as follows:
 - a. Measurement: Aggregate drainage fill and sand cushion, including placement and compaction will be measured for payment by the cubic yard, and quantities will be computed, based on the neat lines or pay lines, section profiles, and dimensions indicated on the Contract Drawings.

- b. Payment: Aggregate drainage fill and sand cushion will be paid for at the indicated Contract unit prices for the computed quantities as determined by the measurement method specified in Article 1.03.C. herein.

1.04 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. ASTM C33/
C33M Standard Specification for Concrete Aggregates
2. ASTM C131/
C131M Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
3. ASTM C136/
C136M Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
4. ASTM C144 Standard Specification for Aggregate for Masonry Mortar
5. ASTM C535 Standard Test Method for Resistance to Degradation of Large-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
6. ASTM D4253 Standard Test Method for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table
7. ASTM D4254 Standard Test Method for Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density
8. ASTM D6938 Standard Test Methods for In-Phase Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)

1.05 SUBMITTALS

- A. General: Refer to Contract Specifications Section 01 33 00, Submittal Procedures, and Contract Specifications Section 01 33 23, Shop Drawings, Product Data, and Samples, for submittal requirements and procedures.
- B. Samples: Submit a 10-pound cloth bag of clean and graded aggregates proposed for the aggregate drainage fill for approval.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Aggregate Drainage Fill:

1. Aggregate drainage fill for capillary break under concrete slabs shall consist of broken stone, crushed or uncrushed gravel, clean quarry waste, or a combination thereof, free from adobe, vegetable matter, loam, volcanic tuff, and other deleterious substances. It shall be of such quality that the absorption of water in a saturated surface dry condition does not exceed three percent of the oven dry weight of the samples.
2. Aggregate drainage fill shall be of such size that the percentage composition by dry weight as determined by laboratory sieves (U.S. Series) will conform to the following grading when measured in accordance with ASTM C136/C136M:

Sieve Size	Percentage Passing Sieves
1-1/2 inches	100
1 inch	90-100
No. 4	0-5

3. Percentage wear when tested in accordance with ASTM C131/C131M and ASTM C535 shall be 50 percent maximum.

B. Vapor Barrier Materials: Refer to Contract Specifications Section 07 26 00, Vapor Retarders, for requirements.

C. Sand Cushion: Sand for sand cushion or blanket under slabs and over vapor barrier shall be a clean and graded, washed sand, all passing a No. 4 U.S. Standard Sieve, and conforming generally to ASTM C33/C33M for fine aggregate. Clean masonry aggregate conforming to ASTM C144 is also acceptable.

PART 3 – EXECUTION

3.01 EXAMINATION

- A. The Contractor shall call for an inspection by the Engineer and obtain written approval of the prepared sub grade or sub base before proceeding with placing of the aggregate drainage fill.
- B. The sub grade or sub base to receive aggregate drainage fill shall conform to the compaction and elevation tolerances indicated for the material involved and shall be free of standing water and loose or extraneous material.

3.02 INSTALLATION

A. Aggregate Drainage Fill:

1. Pipes, drains, conduits, and any other mechanical or electrical installations shall be in place before any aggregate drainage fill is placed. Backfill at walls to elevation of drainage fill shall be in place and compacted.
2. Aggregate drainage fill under concrete slabs shall be the minimum uniform thickness after compaction of dimensions indicated. Where not indicated, minimum thickness after compaction shall be four inches.
3. Aggregate drainage fill shall be compacted with appropriate compaction equipment to form a well-compacted bed. Provide for relative density of 75 percent as determined by ASTM D4253, Dry Method, and ASTM D4254, Method A.
4. Heavy equipment shall not be used within four feet of concrete walls. Instead, aggregate drainage fill shall be compacted with suitable light equipment, such as hand-held mechanical tampers.
5. The Contractor shall have the Engineer inspect and approve the finished aggregate drainage fill before proceeding with any subsequent construction over the compacted fill.

B. Vapor Barrier Installation: Lay vapor-barrier membrane over the compacted aggregate drainage fill as specified in Contract Specifications Section 07 26 00, Vapor Retarders.

C. Sand Cushion: A sand cushion shall be placed over the vapor barrier membrane under concrete building slabs on grade. Sand cushion shall be placed in uniform thickness indicated. Where not indicated, thickness shall be two inches.

3.03 FIELD QUALITY CONTROL

A. The Contractor shall perform field tests in accordance with ASTM D6938 to determine compliance with specified requirements for density and compaction of the installed aggregate drainage fill.

END OF SECTION 32 11 24